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Presentation

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# Training of a Weightlifter: A Scientific Approach

SHYAM CHAVDA

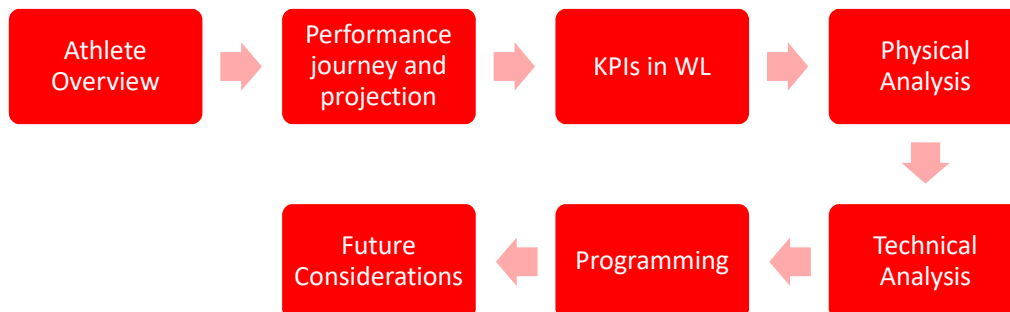
LONDON SPORT INSTITUTE, MIDDLESEX UNIVERSITY



@shy\_2tweet

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## Content



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## Athlete Overview

**Name** : Cyrille Tchatchet II

**Age**: 23

**Occupation** : Mental Health Nurse / Student / Weightlifter

**Primary Weight Class** : 94 < 96 kg (102 kg)

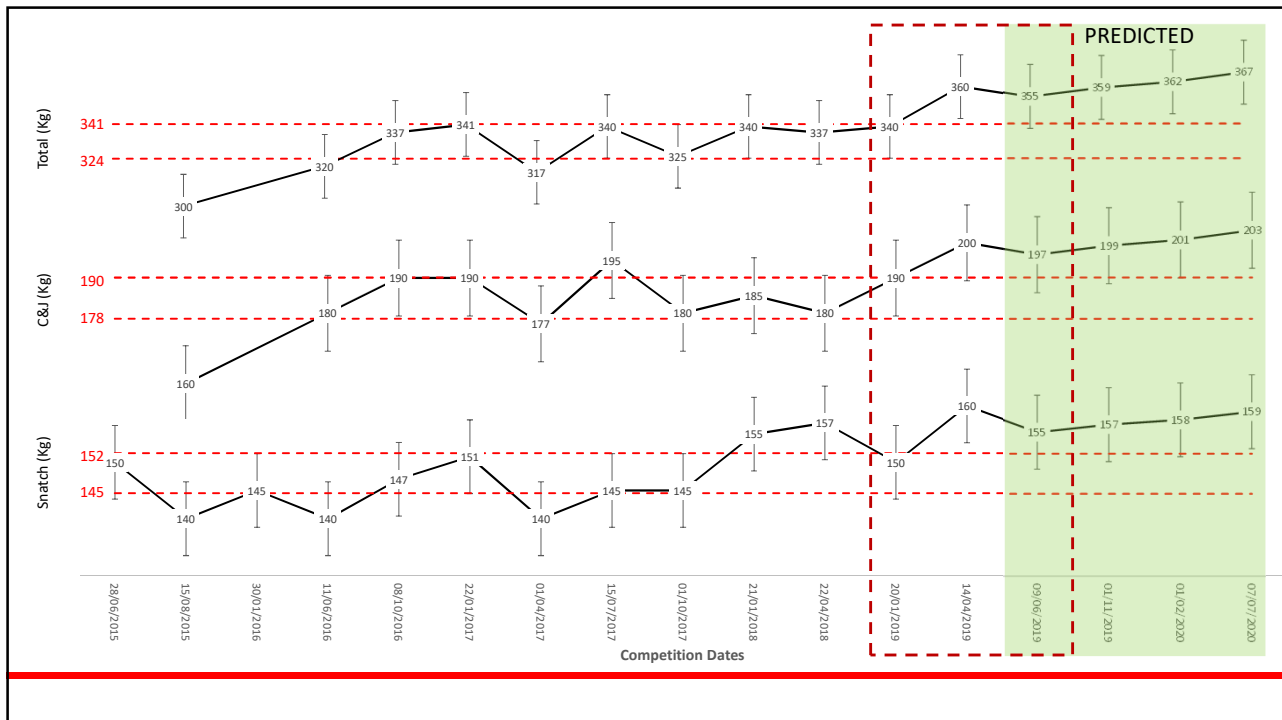
**Injury** : Knee pathology



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**From the Commonwealth Games to homelessness: the Cameroonian refugee weightlifter hoping to make it to the Tokyo Olympics**

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## Key Performance Indicators (KPI)

Bar kinetics and kinematics<sup>1,2,3</sup>

Anthropometry<sup>4</sup>

Flexibility

Mindset

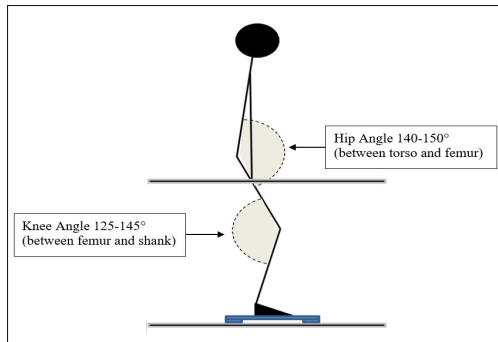
Strength & Power<sup>3,5</sup>

<sup>1</sup>Garhammer (1979) ; <sup>2</sup>Gourgoulis et al (2009); <sup>3</sup>Harbili and Alptekin (2014); <sup>4</sup>Ebada (2013); <sup>5</sup>Beckham et al (2013)

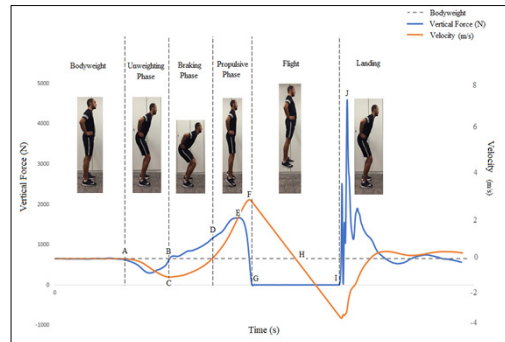
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## IMTP & CMJ Testing

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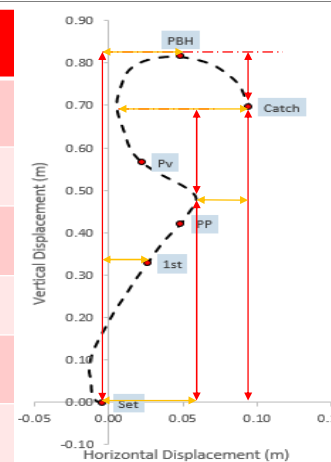
Peak Force (N), relative Peak Force (N/Kg)

Impulse (Ns)<sup>5</sup>, Jump Height (cm)<sup>5, 7</sup>, Power (W)<sup>9</sup>Well related to WLP<sup>5, 7, 9</sup>PF (N) = 0.805<sup>\*</sup>ConImp = 0.769<sup>\*</sup>\*unpublished data; <sup>5</sup>Beckham et al 2013; <sup>6</sup>Chavda et al (in press); <sup>7</sup>Haff et al (2005); <sup>8</sup>Chavda et al (2018); <sup>9</sup>Carlock et al (2004)

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## Barbell Trajectory

Point of Interest	Identifier	Key
Set	First frame before 0.01m displacement.	Set
1 <sup>st</sup> Pull	1 <sup>st</sup> vertical peak and 0 acceleration.	1 <sup>st</sup>
Power Position	Lowest v value after 1 <sup>st</sup> peak v and 0 acceleration.**	PP
Peak Velocity	Peak v value.	Pv
Peak Bar Height	Peak vertical displacement of barbell and 0 v.	PBH
Catch	Minimum displacement of barbell and 0 v.	Catch

<sup>10</sup> Stone et al (1998); <sup>11</sup>Iikeda et al (2012)

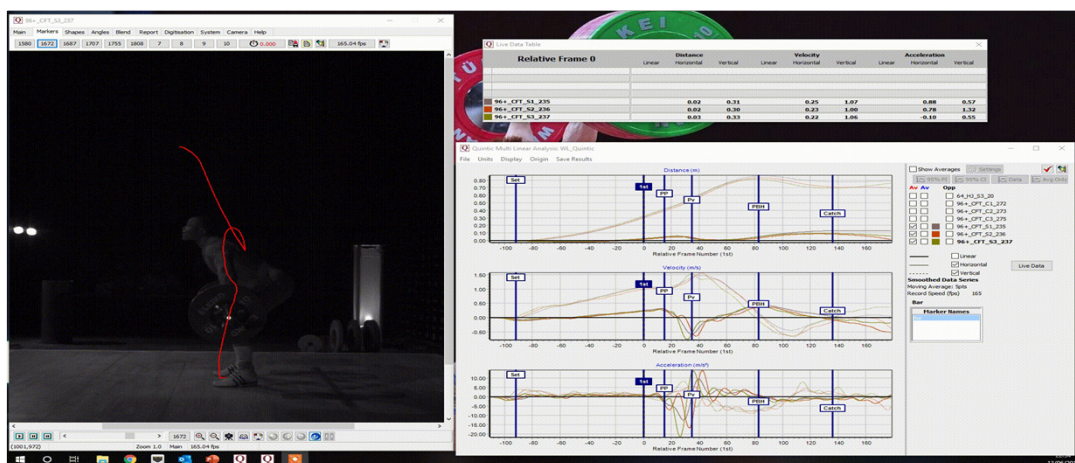
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# Technical Analysis



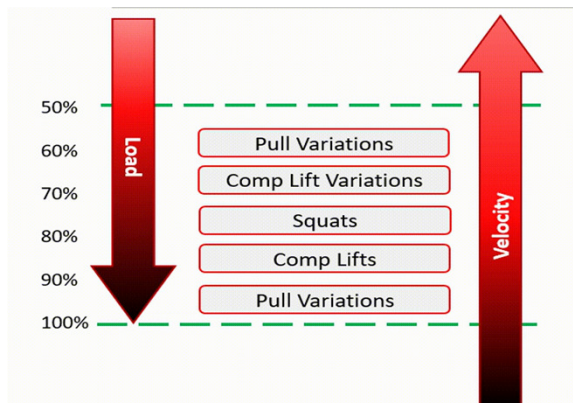
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# Technical Analysis



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## Exercise Selection

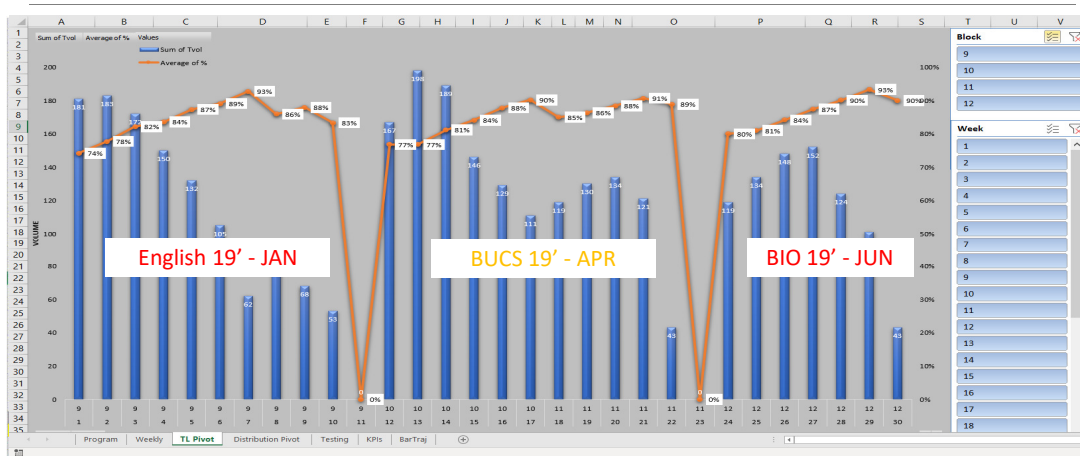


Primary Objective : "Improve pull to PP"	Intensity Range	Set x Rep Range
Secondary Objective : "Improve bar path after contact"		
MTC Pull	140-150%	3-4 x 4-1
Pulls (+ Power Pulls)	90-110%	2-5 x 3-1
Comp Lift Derivatives @ Knee from blocks	70-85%	3-5 x 2-3
High Pull	60-80%	3-4 x 4-2

<sup>12</sup>Suchomel, Comfort and Stone (2015); <sup>13</sup>Suchomel, Comfort and Lake (2017)

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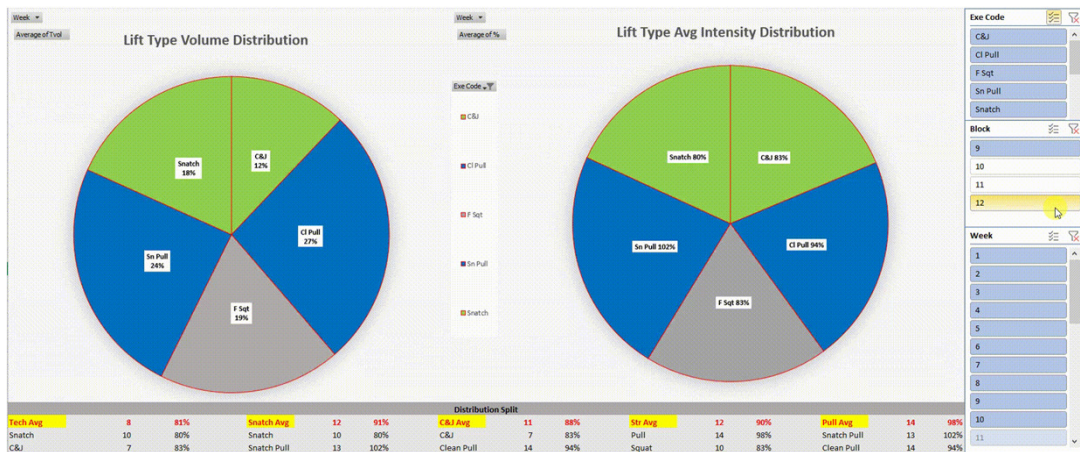
## Programming & Distribution



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## Programming & Distribution



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## Performance Outcomes

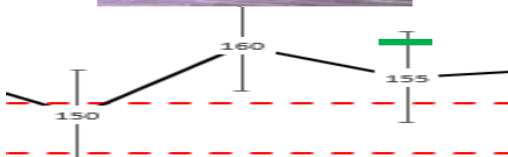
**Snatch – 161 nr lpb**



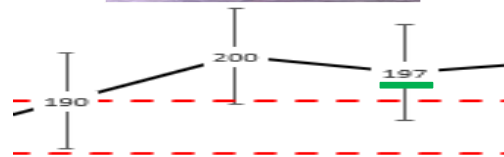
Projected : 355kg

Attempted : 366kg

Achieved : 356kg



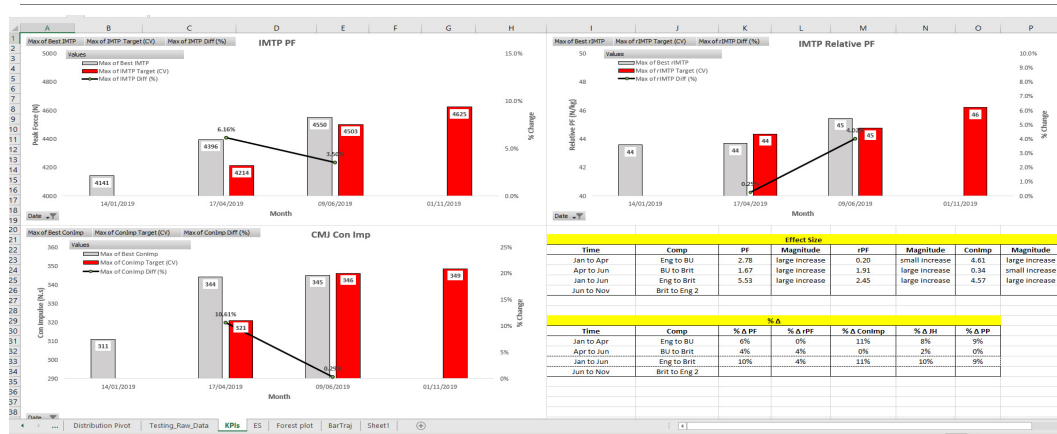
**C&J – 205x nr lpb**



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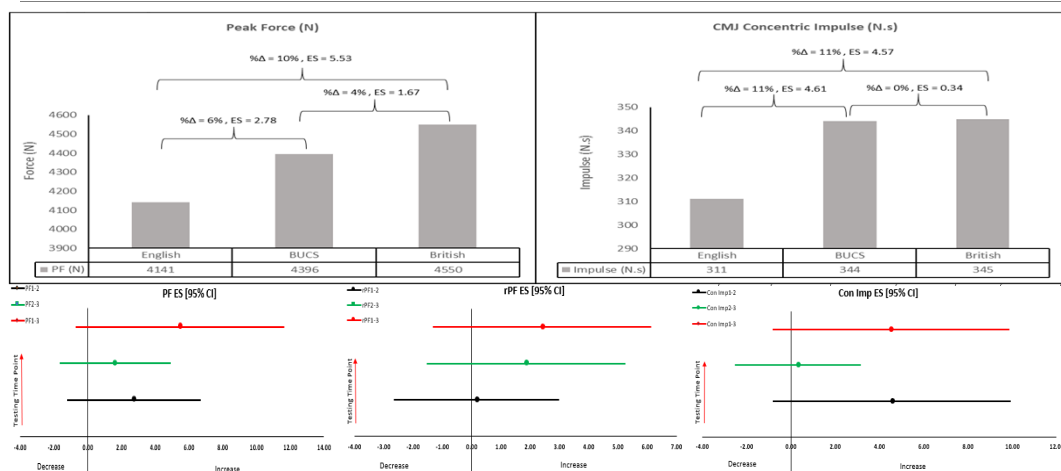


# Physical KPI's



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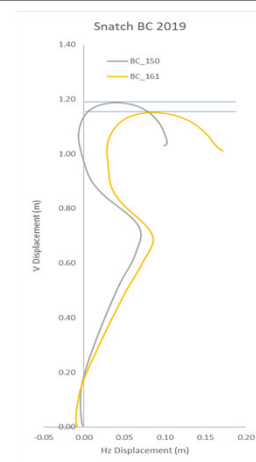
# Physical KPI's



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## Future Considerations

- Standardise training capture.
- Utilise average trajectories and associated variables from training.
- Explore alternative IMTP F metrics (i.e F@Tp, Impulse).
- Refine regression analysis and change boundaries.



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Thank you..  
Questions?



@liCyrille



@Cyrille\_fagat

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ASSOCIATION

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## References

- 1) Garhammer J. Performance evaluation of Olympic weightlifters. *Med Sci Sports*, 11(3): 284-287, 1979.
- 2) Gourgoulis V., Aggelousis N., Garas A., and Mavromatis G. Unsuccessful Vs. successful performance in snatch lifts: A kinematic approach. *J Strength Cond Res*, 23(2): 486-494, 2009.
- 3) Harbili E., and Alptekin A. Comparative kinematic analysis of the snatch lifts in elite male adolescent weightlifters. *J Sport Sci Med*, 13: 417-422, 2014.
- 4) Ebada K. Anthropometric measurements, somatotypes and physical abilities as a function to predict the selection of talents junior weightlifters. *Sci Movements Health*, 13(2): 166-172, 2013.
- 5) Beckham G., Mizuguchi S., Carter C., Sato K., Ramsey M., Lamont H., Hornsby G., Haff G G., and Stone M. Relationship of isometric mid-thigh pull variables to weightlifting performance. *J Sports Med and Physical Fit*, 53(5): 573-581, 2013.
- 6) Chavda S., Williams S., Turner A N., Bishop C., Lake J., Comfort P., and Haff G G. A Practical Guide to Analysing the Force-Time Curve of Isometric Tasks in Excel. *In Press*.
- 7) Haff G G., Carlock J M., Hartman M J., Kilgore J L., Kawamori N., Jackson J R., Morris R T., Sands W A., and Stone M H. Force-time curve characteristics of dynamic and isometric muscle actions of elite women Olympic weightlifters. *J Strength Cond Res*, 19(4): 741-748, 2005.
- 8) Chavda S., Bromely T., Jarvis P., Williams S., Bishop C., Turner A N., Lake J., and Mundy P D. Force-time characteristics of the countermovement jump: analysing the curve in excel. *Strength Cond J*, 40(2): 67-77, 2018.
- 9) Carlock J M., Smith S L., Hartman M J., Morris R T., Ciroslan D A., Pierce K C., Newton R U., Harman E A., Sands W A., and Stone M H. The relationship between vertical jump power estimates and weightlifting ability: A field test approach. *J Strength Cond Res*, 18(3): 534-539, 2004.
- 10) Stone M H., O'Bryant H S., Williams F E., and Johnson R L. Analysis of bar paths during the snatch in elite male weightlifters. *Strength Cond*, 30-38, 1998.
- 11) Ikeda Y., Jinji T., Matsubayashi T., Matsuo A., Inagaki E., Takemata T., and Kikuta M. Comparison of the snatch technique for female weightlifters at the 2008 Asian championships. *J Strength Cond Res*, 26(5): 1281-1295, 2012.
- 12) Suchomei T., Comfort P., and Stone M H. Weightlifting pulling derivatives: Rationale for implementation and application. *Sports Med*, 46(6): 823-839, 2015.
- 13) Suchomei T., Comfort P., and Lake, J P. Enhancing the force velocity profile of athletes using weightlifting derivatives. *Strength Cond J*, 39(1): 10-20, 2017.